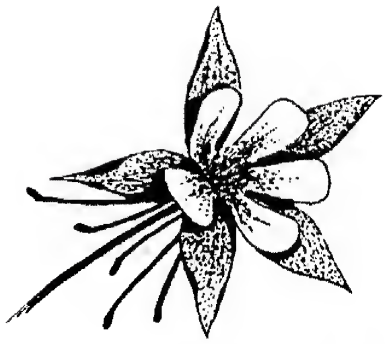
Aquilegia



Newsletter of the Colorado Native Plant Society

". . . dedicated to the appreciation and conservation of the Colorado native flora"

Volume 13, Number 6 **November/December 1989**

A Place to Find Ferns

Peter Root

Colorado is not generally a good place to look for ferns. In 1938, Edgar Wherry, an eminent pteridologist, wrote that it was possible to drive a hundred miles and see only an *Equisetum* or climb 500 feet and see only *Cystopteris fragilis*. He was right. But there are a few good places to find ferns in Colorado. One is the trail along Vallecito Creek running north from Vallecito Campground in the San Juan National Forest.

At the beginning of the trail you will see some bladder ferns (*Cystopteris* sp.) on the rocks to your left. I haven't taken time to look closely at them because there are so many other things to see. The trail moves up through aspen and Douglas-fir and you will see some large bracken (*Pteridium aquilinum* var. *pubescens*). As you go into a switchback section crossing a hill of gray granite you may find patches of *Cystopteris reevesiana*, another bladder fern. I was last here in September, and these plants had been revived by rain. Farther along, as you go around the hill, you can find *Cheilanthes fendleri*, one of the southwestern lipferns, and *Woodsia mexicana*, a member of the confusing cliff fern genus.

The trail is now following the creek north and you may see Mexican white pine (*Pinus strobiformis*). Along the edge of the trail the feathery fertile leaves of *Cryptogramma acrostichoides*, the parsley fern, can be seen rising above its parsley-like sterile leaves. The maidenhair spleenwort (*Asplenium trichomanes*) grows in rock crevices, as do a few male ferns (*Dryopteris filix-mas*).

In a wet pile of rocks you will see the vertical stems of the scouring rush (*Equisetum hyemale*) and a large mossy rock face has a good colony of western polypody (*Polypodium hesperium*) which in Colorado has been found only in the San Juan Mountains. Front Range polypodies are another species, *P. amorphum*. If you look off the trail on a brushy talus slope, you will find large male ferns, and also the holly fern (*Polystichum lonchitis*).

By this time you will have gone about two miles up the trail. The walk is not too difficult. If you would go a few miles more, the walk would be harder, but you would probably make more fern discoveries. This is the best assortment of ferns I have seen in Colorado. I have been there three times, and will go again whenever I am in southwestern Colorado.

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A New Look for Aquilegia

Over the last few years, *Aquilegia* has grown in size and in the variety and quality of the articles presented. In keeping with these improvements, we are upgrading our appearance for 1990.

The change to three-column format, under consideration for several months, has been accomplished, and we have introduced a change in typeface to a warmer, more classic style. These changes will increase space and add layout flexibility.

We are continuing a trend toward more standardized features. Look for Board minutes and other Society information on page 2 in future issues. Page 4 will be devoted to Chapter news, and we earnestly solicit more regular columns from each of our chapters. Members are interested in reports on chapter events, as well as meeting schedules. This is a special opportunity for our new chapters to gain recognition of their activities. Masthead and related information has been moved from the back cover to this page; look for calendars and special announcements on the back cover.

We hope these changes will help make *Aquilegia* more readable and more useful to Society members, and we look forward to your thoughts on our efforts to provide a more finished newsletter.

— **The Editorial Committee:**

Peter Root
Velma Richards
Elizabeth Otto
Sally White

. . . and New Guidelines

We publish a variety of articles of interest to members in *Aquilegia*. As we improve the newsletter, we ask your help in ensuring a quality publication. **Short items (200 to 500 words) of all kinds of interest to plant enthusiasts are welcome.** Longer items will be printed as space is available. If articles are longer than two double-spaced typewritten pages (about 500 words), we prefer they be submitted on disk if possible.

Remember that all items in the newsletter must be typed by volunteers. Please do initial editing before submitting to ensure articles are direct and to the point. Concisely written materials are less likely to require cuts at our discretion.

Plant illustrations are especially welcome, and are always helpful to have!

Aquilegia

Aquilegia is published six times per year by the Colorado Native Plant Society. This newsletter is available to members of the Society, and others with an interest in native plants. Contact the Society for subscription information.

Articles from *Aquilegia* may be used by other native plant societies if fully cited to author and attributed to *Aquilegia*.

The Colorado Native Plant Society is a non-profit organization dedicated to the appreciation and conservation of the Colorado native flora. Membership is open to all with an interest in our native plants, and is comprised of plant enthusiasts, both professional and non-professional.

Please join us in helping to encourage interest in enjoying and protecting the variety of native plants in Colorado. The Society sponsors field trips, workshops and other activities through local chapters and statewide. Contact the Society or a chapter representative or committee chair for more information.

Schedule of Membership Fees

Life	$250.00
Family or Dual	$ 12.00
Supporting	$ 50.00
Individual	$ 8.00
Organization	$ 25.00
Student or Senior	$ 4.00

Membership Renewals/Information

Please direct all membership applications, renewals and address changes to the Membership chairperson, in care of the Society's mailing address.

Please direct all other inquiries regarding the Society to the Secretary in care of the Society's mailing address.

Newsletter Contributions

Please direct all contributions to the newsletter to:

Peter Root
4915 West 31st Avenue
Denver, CO 80212

Deadlines for newsletter materials are February 15, April 15, June 15, August 15, October 15 and December 15.

Officers

President	Jim Borland	329-9198
Vice-President	Will Moir	
Secretary	Rob Udall	482-9826
Treasurer	Myrna P. Steinkamp	226-3371

Board of Directors

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Jim Borland (90)	Denver	329-9198
Beth Painter (91)	Ft Collins	482-2283
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Boulder	Margie Wortzman	494-1640
Denver Metro	Carol Dawson	722-6758
Ft. Collins	Jennifer Crane	493-2142
Yamparika	Reed Kelley	678-4666
San Juan	Peggy Lyon	626-5526

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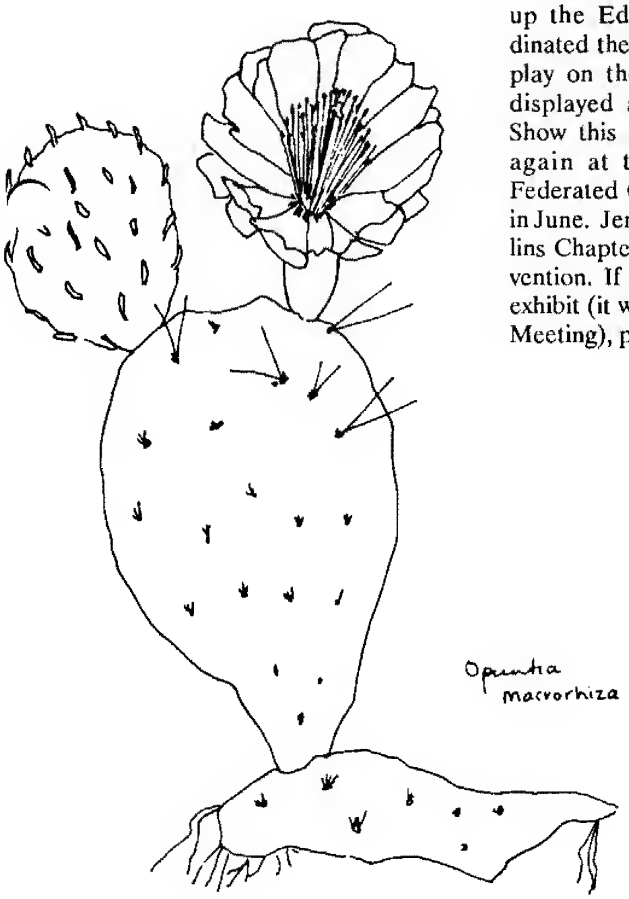
Conservation	Sue Martin	226-3371
Editorial	Peter Root	433-9340
Education	Miriam Denham	442-1020
Field Trips	Jeff Dawson	722-6758
Florissant	Mary Edwards	233-8133
Horticulture/ Rehabilitation	Dorothy Udall	482-9826
Membership	Myrna Steinkamp	226-3371
Publicity	Tina Jones	759-9701
Workshops	Bill Jennings	666-8348

Thanks!

It has been an honor and a privilege for me to have served the Colorado Native Plant Society as president during the last four years. All of you have helped to make my tasks easy and enjoyable. For that, I wish to extend my sincere thanks.

I look forward to seeing the Society grow in new and exciting ways during the coming years. There is much work to be done, and it will provide a challenge for all of us.

– Eleanor Von Bargen



BOARD NOTES

The Board has met three times since the last newsletter and lots of changes have occurred. The Annual meeting has come and gone. And we have elected new Board members and officers for the upcoming year (see the new listing on page 2). Eleanor Von Bargen, after four years of leading the Society through thick and thin, but primarily through the Rare Plant Monograph, has stepped down. Meg Van Ness, long time Secretary, has also retired to spend more time with her new baby. Our new officers are:

Jim Borland	**President**
Will Moir	**Vice President**
Robert Udall	**Secretary**
Myrna Steinkamp	**Treasurer**

Our numerous Society Committees have been active. Miriam Denham, heading up the Education Committee, coordinated the production of a poster display on the Rose Family. This was displayed at the Home and Garden Show this past spring in Denver and again at the State Convention of Federated Garden Clubs in Longmont in June. Jennifer Crane of the Fort Collins Chapter helped out with that convention. If you would like to use this exhibit (it was on display at the Annual Meeting), please call Miriam.

The Conservation Committee has been busy commenting on our behalf on numerous Bureau of Land Management Resource Management Plans, environmental assessments, and proposals for expansions to the Colorado and Gunnison National Monuments. If you are interested in helping out on this committee, please give Sue Martin or Tamara Naumann a call.

A group of Society members have been working in Rocky Mountain National Park on the Restoration Research Project. Work on this project started this past summer and will continue for several years. Call Velma Richards if you have an interest in studying vegetative restoration in the Park.

And the Rare Plant Mongraph is selling moderately to well in bookstores and at National Parks and Monuments around the state.

The biggest news, though, is the Society has approved two new Chapters, both on the West Slope. The Yamparika has been organized by Reed Kelly who is now serving as Chapter president. Members in the Meeker area who are interested in attending Chapter meetings and other activities should give Reed a call. The Chapter has been named after the Native Americans who inhabited the area between the Yampa and Green Rivers and fed on the yampa plant. The next issue of the newsletter should include an article explaining all of this.

The San Juan Chapter has been organized by Peggy Lyon and includes the area around Montrose. Peggy has some great things planned for this Chapter so give her a call if you live in that area. (See page 2 for phone numbers.)

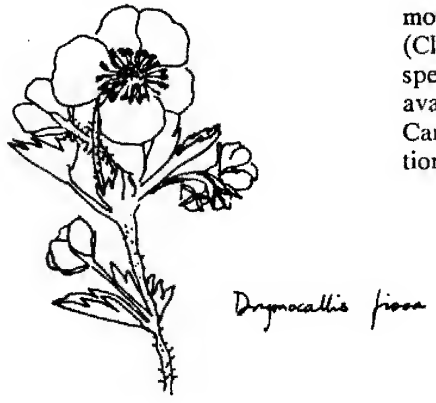
As you can see, the Board and Committees have been active over the past few months, but our activity depends upon you. We've got a great bunch of people keeping the Society growing and a strong voice in the conservation community, but we can always use more. Think about how you can contribute to your Society as we continue to expand. Thanks.

Chapter News and Schedules

All Chapters!

Please continue to share meeting notices, as well as reports of field trips and other activities!

We look forward to hearing more from our local groups.



Next Issue . . .

Look for information on the new Yamparika Chapter –

and the story of how they got their name!

Denver Activities

December 20th: Classroom A. Diana Tomback, Dept. of Biology, University of Colorado at Denver, will present a program concerning her research on the status of the white bark pine, *Pinus albicaulis*. **Note: this is 3rd Wednesday.**

January 24th: Classroom C. Bob Heapes, well-known wildflower photographer, will present a program entitled "Our wildflower heritage – a look at the western landscape through the eyes of some early explorers."

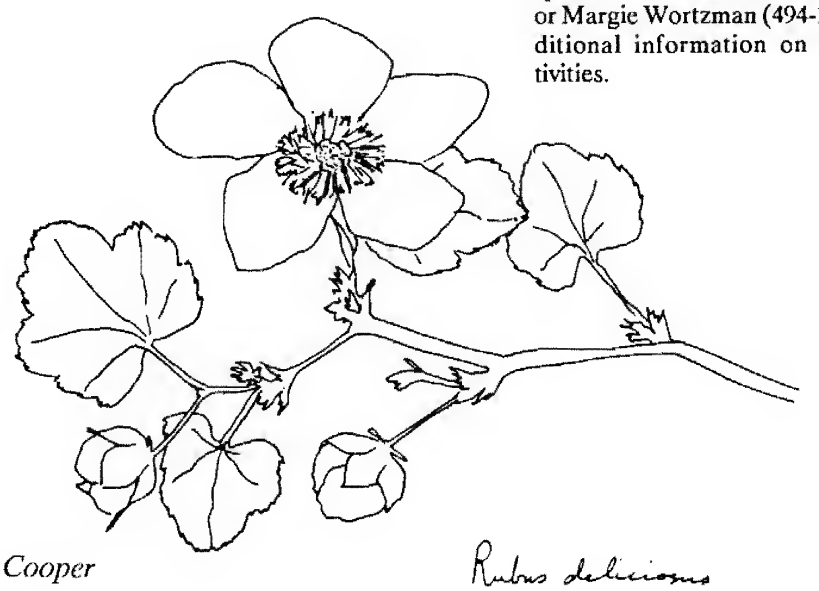
The Denver Chapter usually meets on the **fourth Wednesday** of the each month at the Denver Botanic Gardens (Classroom A or C) at 7:30 PM. Lists of speakers for future meetings will be available at each meeting. Contact Carol Dawson (722-6758) for information on chapter activities.

Boulder Meetings

Tuesday December 12th: *Winter Twig Identification*, presented by Miriam Denham. On a winter's walk, you are apt to notice many woody plants and wonder what they are. In the growing season, flowers, fruits and leaves permit identification. In winter with a hand lens and appropriate keys, many of these woody plants can also be identified. Bring a hand lens and a book on winter botany.

Tuesday, January 9th: *The Ecology Program of the Pike and San Isabel National Forests in Region 2* presented by Judy von Ahlefeldt. Judy is a graduate student in the Biology Dept. at CSU and is completing a PhD program in Plant Ecology. She worked as an ecologist for the Pike-San Isabel National Forest in Pueblo for the summer of 1989, developing programs for threatened and endangered species, riparian area surveys, and use of remote sensing for location and management of sensitive species and habitats.

Boulder meetings are held at 7:30 PM at the Foothills Nature Center, 4201 No. Broadway, Boulder, unless otherwise specified. Call Nan Lederer (447-1899) or Margie Wortzman (494-1640) for additional information on chapter activities.



Illustrations by Ann Cooper

INK MARBLES AND OTHER MARVELS

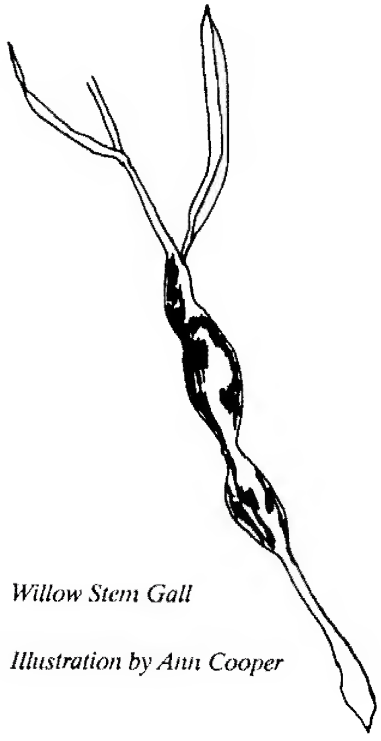
nn C Cooper

"What gall!" you might say as someone pushes in front of you in the movie line or "How very galling," as you arrive, flushed and bedraggled, at the bus stop only to see the bus pulling away, the driver oblivious of your frustrated yells. What you are expressing is extreme annoyance and irritation.

The very same word, **gall,** is used in the world of plants to describe the *results* of an irritation.

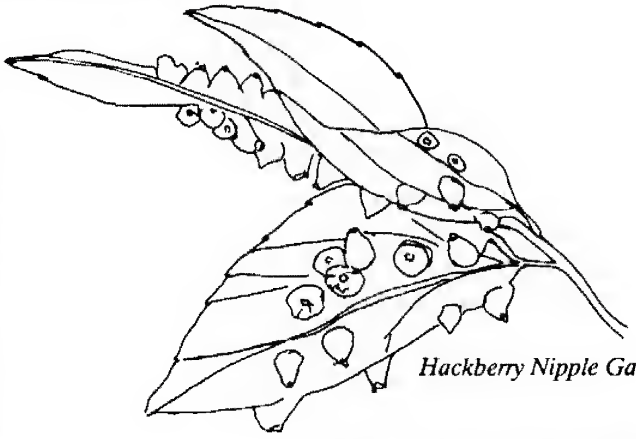
It's impossible to botanize without noticing the bumps and lumps of various shapes and sizes on the leaves, stems, flowers, or roots of certain plants. Many people dismiss these growths as "just galls" without speculating on their origin or cause, and thereby miss a by-road of fairly useless but fascinating information!

The occupants of galls are mostly insects, but can be mites, fungi, bacteria, r others. The galls grow as a result of the irritation caused by the chemicals released by the inhabitants of the gall (or the creatures who deposited the inhabitants there in the first place).



Willow Stem Gall

Illustration by Ann Cooper



Hackberry Nipple Gall

Galls have been likened to "cancers" of animal tissue, but this is a misleading parallel. Cancers, once started, are self-perpetuating, whereas galls continue growing only as long as the chemical irritant continues to be released by the gall home-owner.

Why would insects form galls anyway? It's almost like a small child's dream of living in a candy factory! The gall becomes an edible home and safe-house for its resident. Follow a typical life cycle. The adult insect lays an egg, or many eggs, either on, or injected into, the plant which is to be the unwitting host and nursery. After a while this egg hatches into a larva in this safe place. The larva, secreting a chemical irritant that causes the gall to grow, grows as the gall grows, eating away at the inside of the gall chamber. Sometimes it is the larva that burrows out of the gall to move onto another host or a free-form life. Sometimes the larva pupates and later the adult insect emerges to find a mate and a suitable place to lay her eggs and so carry on the perpetual cycle. Either way, the gall provides an edible safe-house for the growing creature.

It's not always a safe house though! Nature is full of controls. Gall insects themselves can be preyed upon by yet other insects which devour eggs or larvae, or lay eggs inside the larvae to parasitize them as the two species go through their parallel growth cycles. Open up a gall! You may be lucky and find one or several larvae inside, or there may be nothing left, either because the resident has been eaten or moved out.

A remarkable variety of galls can be found growing on almost any part of many plants. Some grow as formless swellings, others have intricate structures. The shape of the gall is primarily determined by the insect that causes it. Because the insect selects not only a certain kind of plant, but also a specific part of that plant on which to lay the eggs, the galls caused by a particular insect (or mite, or fungus...) are remarkably constant in form. They provide a better means of identifying the gall-maker than most of us would get by looking at the insect in question! Two groups of insects are responsible for a high percentage of the galls found, the gall midges (Cecidomydae), and the gall wasps (Cynipidae). Within these groups are many look-alike species. They are best identified by the architecture they create.

Most galls don't do much harm to the plant they grow on--that would be self-defeating. Some, like the galls on our Colorado blue spruces (those brown swellings on the tips of the branches that are so often mistaken for cones by people new to trees), are regarded as unsightly. But unless the tree is already weak from some other cause, the spruce galls serve only to prune the tree a little. Other galls that cause the leaves of certain apple and cherry trees to curl and shrivel slightly reduce the plant's capacity to manufacture food, but are usually not life-threatening. More serious damage is done by gall-makers like hessian flies. Their eggs hatch into voracious larvae, which live in galls at the leaf-stem junctions of the grasses they inhabit. A heavy infestation stunts or kills the hosts, often species of wheat.

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CONPS Workshops for Fall

Bill Jennings

The Colorado Native Plant Society workshop series was established with the objective of having something to do during the winter when field trips are impossible. Since the first workshop in January 1985, thirty-five have been held.

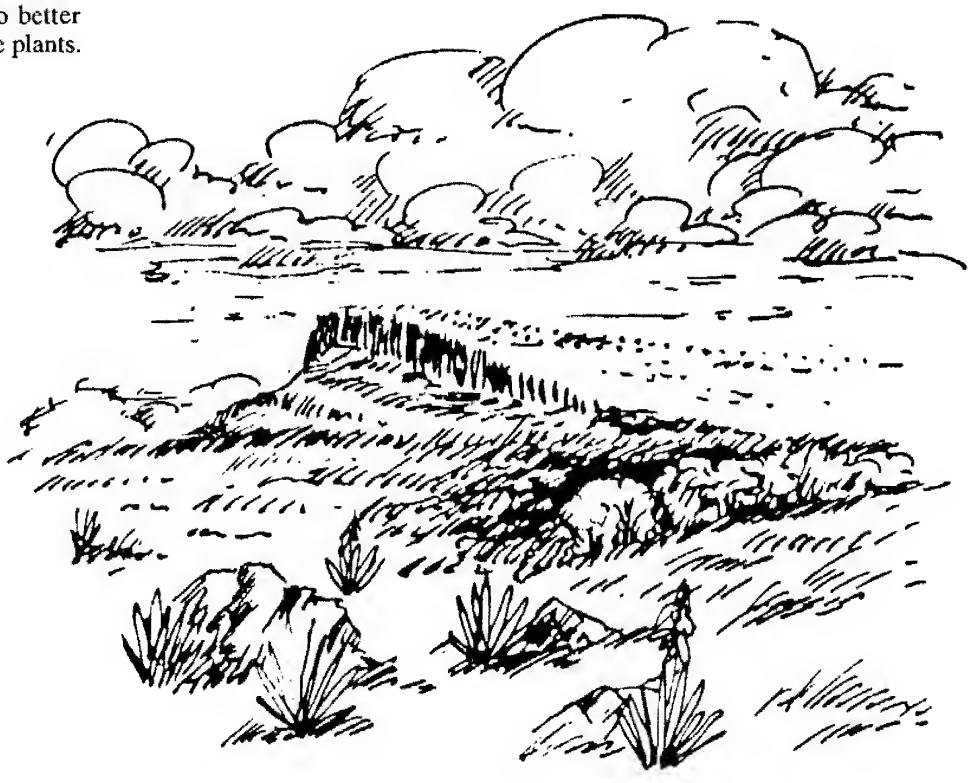
Our concept of a workshop means bringing together plant lovers and a well-informed instructor who has photographs, herbarium specimens and live plants for the attendees to study hands-on, with opportunities for one-on-one interaction with the instructor as well as lectures to the group as a whole. No special skills or requirements, other than a love of plants and a desire to learn, are necessary for attending a workshop. Even though the descriptions may make these workshops sound highly technical, the case is exactly the opposite. The objective is to demystify plant identification and to allow the confused but sincere plant lover to better enjoy and understand our native plants.

Bryophytes: An Introduction

Saturday, February 3, 1990

Dr. David Jamieson

The bryophytes (mosses and liverworts) are an interesting, but problematic, group because the structures that must be studied for identification are so small. Dr. Jamieson, of Fort Lewis College in Durango, has been studying the bryophytes in southwestern Colorado for many years. In this workshop, an important complement to our previous excursions into the lower plants (lichens, ferns, and fern allies), he will show us the diagnostic features of the mosses and liverworts, and the distinctions between the genera that can be found in Colorado. Location to be announced, but will be somewhere in the Denver metro area, not in Durango.



More Winter Workshops

Primroses and their relatives in the Rocky Mountains

Saturday, February 24, 1990
Dr. Tass Kelso

Although there are rather few representatives of the Primulaceae in Colorado, as one proceeds onto the Colorado Plateau or into the Intermountain region, there are a number of interesting rare endemics. Dr. Kelso will take a regional view in this workshop and cover the genera *Primula, Androsace,* and *Dodecatheon* in this family known for its attractive flowers. She is currently working on a key for the western species. If you ever wanted to help construct a key, this is your chance. To be held at Colorado College, Colorado Springs.

Rocky Mountain Moonworts

Saturday, March 17, 1990
Peter Root

Have you seen a *Botrychium*? If you have, you have had an experience many professional botanists have missed. Colorado is the home of perhaps a dozen species of these elusive ferns whose taxonomy has changed much in recent years. We will learn how to locate suitable habitats, look for *Botrychiums*, and identify them. If time permits, we will also look at *Equisetum* and *Lycopodium*, two genera of fern-like plants also found in the state. A possible summer trip to a *Botrychium* location near Denver will also be discussed.

Registration for Workshops

Enrollment in workshops is always limited, usually due to room constraints, so you must register in advance. Contact CONPS workshop coordinator for registration and workshop information: **Bill Jennings, P.O. Box 952, Louisville, 80027, phone 303/666-8348.** Be sure to include your mailing address and phone number if you mail in your registration. Registrants will be notified by mail about two weeks prior to the workshop regarding final location, time, lunch, suggested references, etc. Please register promptly, as workshops tend to fill up fast. However, cancellations sometimes create openings, so you might want to check with Bill up to the night before the workshop if you want to try to register at the last minute.

Unless otherwise noted, the fee for each full-day workshop is $8 for members and $16 for non-members. Half-day workshops are $5 and $10, respectively.

Unless the workshop notice specifies, workshops are full-day and lunch is on your own. If you plan to attend more than one workshop per year as a non-member, it is cheaper to join CONPS as an individual member ($8 per year) and come to workshops as a member. Please hold payments until the day of the workshop.

It takes considerable time and effort for the instructors to plan and develop workshops and field trips. Please let us know how you like the workshops and field trips offered by CONPS. We need your suggestions for other workshops and trips, as well as your feedback on whether you found them informative and exciting or dull and uninteresting. We need to know whether we are serving you, our members, the way you wish.

B. hesperium

THE SEARCH FOR ORCHIDS

Bill Jennings

Included below are the latest developments in the search for the elusive wild orchids of Colorado. There are 24 species known for Colorado, with 3 more likely to be found someday in the state. None is common as wildflowers go and many are very rare and seldom seen by the wildflower-loving public.

During 1989, another orchid was identified for Colorado: *Habenaria zothecina* Higgins & Welsh. This relative of the common green bog orchid seems to be confined to hanging gardens and seepy areas in "canyon country," and was previously known only from Utah.

During the CONPS Yampa River raft trip in June, Dr. William A. Weber, Tamara Naumann, and I saw this orchid in bud in Bull Canyon near Harding Hole in Dinosaur National Monument. After the trip, Dr. Weber uncovered two herbarium specimens, also from Dinosaur, that undoubtably were the same taxon: one collected by Steve O'Kane in 1987 at a different locality in Harding Hole, and one collected by Rodeck in 1948 at Barn Cave in Redrock Canyon. Specimens collected at Colorado National Monument may also be this species. On July 25, I visited Higgins & Welsh's type locality near Moab, Utah, and collected a specimen for the University of Colorado herbarium. The Barn Cave site was visited September 1, and plants were seen in late bloom and fruit.

For most of the twentieth century, the majority of American taxonomists have placed the bog orchids in genus *Habenaria*, but Carlyle Luer, in his 1975 book "The Native Orchids of the United States and Canada" used *Platanthera*. The bog orchids of the western mountains were treated by him as the section Limnorchis within genus *Platanthera*. *Limnorchis* as an entirely separate genus was proposed by Rydberg in 1900. Dr. Weber has used *Limnorchis* as the generic name for the bog orchids in his "Rocky Mountain Flora" and "Colorado Flora: Western Slope".

In the west, the taxa that should be included in *Limnorchis* are: *L. hyperborea, L. stricta, L. sparsiflora, L. ensiflora, L. dilatata, L. leucostachys, L. arizonica, L. brevifolia,* and *Habenaria zothecina*. The Colorado species are *L. hyperborea, L. stricta, L. ensifolia, L. dilatata,* and *H. zothecina*.

Tamara Naumann discovered a population of *Spiranthes diluvialis* in Dinosaur National Monument, just across the state line in Uintah County, Utah, not far from the Dinosaur Quarry. Tamara and I counted 48 plants, mostly in fruit, on August 31. In addition, new populations of *S. diluvialis* in Boulder County were confirmed. Dr. David Cooper, a specialist in wetland plants, called to my attention a population in an upland tallgrass prairie area near Cherryvale Road (5 plants seen) and along main Boulder Creek just east of the city (19 plants seen). Mark Gershman, a Boulder City Open Space ranger, reported a single plant in 1988 in an upland location similar to the Cherryvale Road site, but nothing was found in 1989. The large population near the Denver-Boulder Turnpike only had about 200 plants this year. Over 5000 were seen in 1986. At Prospect Park in Wheat Ridge, over 500 plants were counted, the largest bloom known at that locality. Along Clear Creek at the west edge of Golden, only 5 plants were seen, while in the early 1980's hundreds were at this spot.

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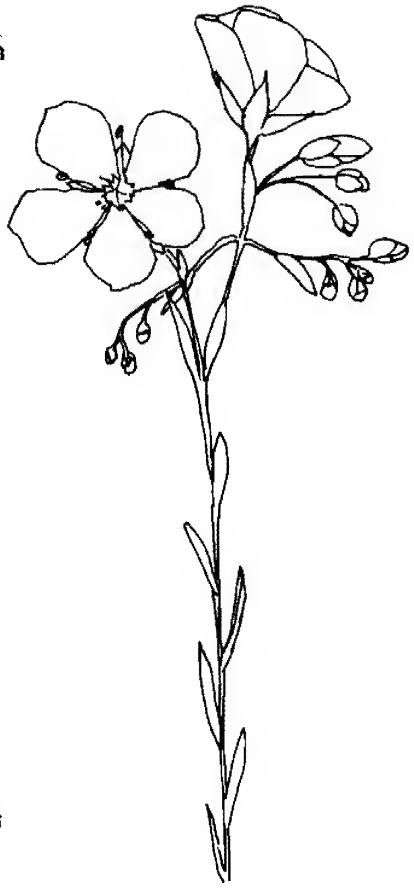

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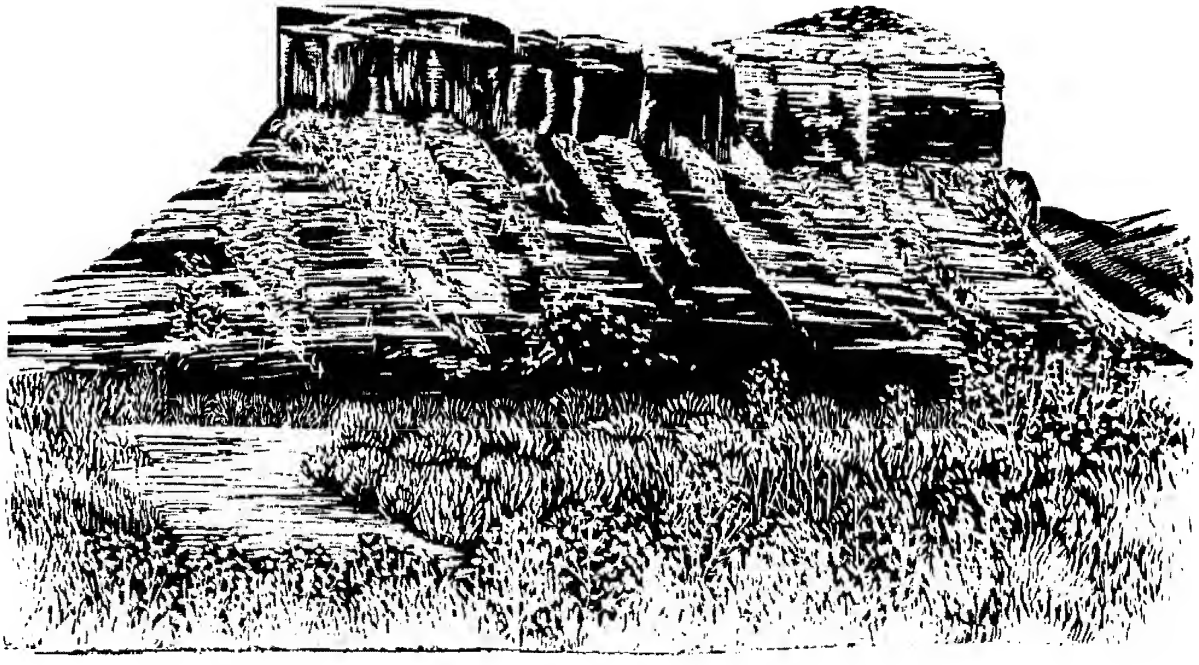
At Unaweep Seep in Unaweep Canyon, Mesa County, Scott Ellis and I checked the identity of the *Spiranthes* that grows there. On July 24, a few dozen orchids were in full bloom on the springy hillside, but they turned out to be *Spiranthes romanozoffiana*. Unaweep Seep is about 2000 feet lower than any other known *S. romanozoffiana* locality in Colorado.

Malaxis brachypoda was seen in "abundance" in Colorado this year. In Boulder County, after intensive search, Harold Dahnke, Tim Hogan, and I found 7 plants. In Jefferson County, 6 plants were found. In some recent years, only one plant has been seen. There are only three sites known in Colorado, and one has not been revisited since 1895. Two other *Malaxis* orchids may someday be found in Colorado: *M. ehrenbergii* and *M. soulei* (*M. macrostachya*). Both have been found less than five miles south of the Colorado state line near Raton.

Epipactis gigantea was found by Tamara Naumann in the Colorado portion of Dinosaur National Monument in 1988, adding Moffat County to the list of West Slope counties where it is known. It turns out to be fairly easy to find in the Utah portion of the Monument, being seen regularly in the canyons in the general area of the Dinosaur Quarry. Mark Gershman discovered a new population at Valleyview Hot Springs in Saguache County. Although no specimen was taken, his excellent photographs confirmed the identification. A specimen will be sought in 1990. In Escalante Canyon, in the area where Mesa, Delta, and Montrose Counties join, there are at least three hanging gardens where *Epipactis* can be found. The orchid should be sought in other canyons in this area as well as in the Dolores River Canyon.

Persons interested in rare plants are advised to obtain a copy of the CONPS guidelines for collection of plant specimens, the Colorado Natural Areas Program's list of plant species of special concern, and then thoroughly know the rare plants before attempting to make herbarium specimens.

Any collections cited above have been placed or were seen at the University of Colorado, Brigham Young University, or other western herbaria. Articles cited were seen at the University of Colorado or Denver Botanic Gardens libraries or were obtained through inter-library loan.



PUEBLO WEST/ARKANSAS VALLEY FIELD TRIP, JULY 8, 1989

Rick Brune

Although the official temperature in Pueblo was 105°, Jim Borland's group of asbestos-skinned botanists suffered no ill effects exploring the Niobrara shale hills west of Pueblo, Colorado.

Our trip began with an interesting presentation on cement manufacturing at the Ideal Basic Industries cement plant at Portland west of Pueblo. Jim Borland and Ray Patterson (quarry supervisor for Ideal Basic) then led us on a search for rare plants on Ideal Basic property. Here we located the rare *Mirabilis rotundifolia* which is endemic to shale hills between Pueblo and Canon City. Because of the extremely dry, hot weather most plants had not flowered and were only about 10 cm tall. They were quickly becoming dry and dormant. Without flowers, *M. rotundifolia* looks very much like *M. multiflora* with which it grows. The leaf differences distinguishing the two species are associated primarily with the lowest leaves, *M. rotundifolia* having rounder leaves at the base. These lowest leaves are also the first leaves shed during drought which results in a plant easily mistaken for *M. multiflora* (and vice versa).

Another look-alike growing here is *M. hirsuta*. Both *M. hirsuta* and *M rotundifolia* have hirsute stems. Based on vegetative characteristics alone (which may be all that's present during summer drought), these three *Mirabilis* species are very easily misidentified.

The rare *Parthenium tetraneuris* is locally abundant on cement plant property on shale knolls. This species was also nearing dormancy due to drought. Flowerless, it is easily overlooked and dismissed as just another low form of *Astragalus, Hymenoxys, Phlox,* etc. The range of *P. tetraneuris* is mostly limited to the area between Pueblo and Canon City. Here it associates with *Frankenia jamesii, Juniperus monosperma, Pinus edulis,* and *Artemisia* spp. The *F. jamesii* appeared least affected by the drought of all species observed. Several *Frankenia* plants were still producing their delightfully fragrant white blossoms.

Both *M. rotundifolia* and *P. tetraneuris* are threatened by residential expansion and mining for cement production. Ray Patterson appeared very aware and interested in the presence of these two species on Ideal Basic property and he is experimenting with seeding of *P. tetraneuris*.

In addition to rare species, these shale and limestone hills support many other plants including *Eriogonum lachnogynum, Lesquerella fendleri, L. ovalifolia, Hymenoxys acaulis, Melanpodium leucanthum, Stanleya pinnata, Stipa neomexicana, et al.*

After a few hours on the hot shale, a small nearby stream lured our hot-footed group for a little foot-cooling relief. Here Jim Borland soon discovered a new, previously unknown site for a spectacular member of Colorado's rare flora - *Eustoma grandiflora* (tulip gentian). A quick search of the immediate area turned up two additional plants. The plants had buds but no blossoms. A more thorough search later in July should determine population size. The only other *Eustoma* site in the area now lies buried under the dam on the Arkansas River which created Pueblo Reservoir. This new site may be threatened by a proposed mining road in the immediate area.

Our plans for a cool lunch break along the Arkansas River were ruined by thousands of people who took over the river and park for a raft race. After a congenial lunch break in the rapidly diminishing shade of the convenience store at Pueblo West, we explored the surrounding area and found drought-induced dormancy in most species.

A trip to the University of Southern Colorado campus provided us with a look at a small, high quality prairie. Dominated by *Bouteloua gracilis* (blue grama) and *Hilaria jamesii* (galleta), along with *Opuntia imbricata* (candelabra cactus), this small tract of prairie has amazingly escaped the abuse inflicted on the surrounding landscape. It survives as a weed-free tract of natural vegetation in an otherwise weedy, disturbed area. A few wilting purple flowers on the *Opuntia* provided some color, but again the vegetation was doing what comes naturally during drought – it was dormant.

In spite of the drought conditions, Jim Borland again led us on a CONPS field trip to fascinating areas most people seldom, if ever, have an opportunity to visit. In addition to rare plants, the Pueblo area has many interesting species and plant communities worth discovering. Many plants, such as *Frankenia jamesii, Melampodium leucanthum (blackfoot daisy), Mirabilis* spp. (four o'clock), *Stipa neomexicana* (New Mexico feathergrass), *Zinnia grandiflora* and others, are attractive landscape plants. It is unfortunate that our field trips are seldom attended by people from the landscape and nursery trade since many fine native species are always seen that can be used in landscaping.

Mossy rose gall

How to Order Rare Plant Monograph

Rare Plants of Colorado is now available at Colorado State Park or National Park visitor centers, the Denver Botanic Gardens gift shop and selected bookstores in the area, including the Tattered Cover. You may also order direct from the Rocky Mountain Nature Association at $7.95 per copy plus 3% sales tax. Shipping charges are:

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Order from: Rocky Mountain Nature Association
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Estes Park, CO 80517

Galls, continued from page 5

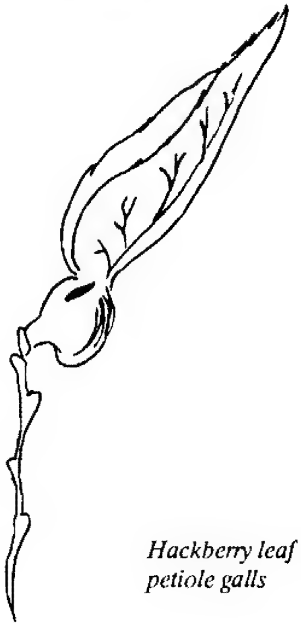
Yet other galls are useful in various ways. The root galls or nodules on the roots of legumes are caused by bacteria. These bacteria use nitrogen (normally biologically inert) to synthesize nitrogen compounds that are usable by their hosts--and other plants. This nitrogen fixation is a vital step in the eventual production of proteins. Think of these galls as fertilizer factories!

Some galls produce a high percentage of carbohydrate (63%) and protein (9.3%) and have been used as animal food, especially in the southern states. Some produce a kind of honeydew that is gathered by bees and imparts a special flavor to the honey. Most curious of all is the Aleppo gall, which grows on oak trees in the Middle East. It has a high content (65%) of tannic acid and has been used for generations in the manufacture of dyes and inks. It probably has a longer history of use than any other gall. The Greeks used it to dye wool and even hair. It has long been a required ingredient in the highest quality of inks (hence its alternative name of ink marble) and some countries have statutes that require that ink used for court records and currency must be made with the Aleppo gall, so that the documents will never fade. This country, Germany and England all claim this rule, but whether it is still upheld is another matter!

When people don't fully understand the causes and presence of a natural phenomena, legends very often grow to explain them. Galls are no exception. Back in the Middle Ages galls were regarded as supernatural growths (very hard to understand the origin of something caused by an agent so small you can't even see it properly!) They were employed to foretell future events. If, when the gall was opened, it contained a maggot, the year would bring famine. If a fly was found, war was forecast. And, God forbid, if a spider was found! That betokened pestilence. There were no happy outcomes!

Anything with so many magical properties was assumed to be something of a cure-all, too! Pliny, in the fifth century BC, recorded twenty three remedies from gall-nuts, including treatment for ulcers, hemorrhages, fevers and burns. This last use is the easiest to understand considering the high tannic acid content of many galls, and even two thousand years later the Aleppo gall is mentioned in the US pharmacopoeia as an ingredient of burn ointment.

There you have it! Don't say, "Just a gall..." Galls have added to our folklore, have been used to write the documents of history, have contributed to our language, have fed livestock (and in some parts of the world people), and have piqued the curiosity of countryside observers who have noticed those strange bumps and lumps. Quite a story for such tiny and unspectacular insects, mites, fungi, and bacteria and the edible homes they inhabit.



Hackberry leaf and petiole galls

Calendar Overview

Additional information about calendar items will be found throughout this issue.

Winter Workshops

February 3rd — **Bryophytes**

Leader: Dr. David Jamieson

February 24th — **Primroses**

Leader: Dr. Tass Kelso

March 17th — **Moonworts**

Leader: Peter Root

Other Events

Chapter Activities — **Page 4**

Denver Meetings: December 20th, January 24th

Boulder Meetings: December 12th, January 9th

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